

ONTARIO MINISTRY OF ENVIRONMENT
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PORT ARTHUR

water pollution control plant

1968

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ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

#1

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P66
1968**

Port Arthur : water pollution
control plant.
81544



Water management in Ontario

Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 7
Ontario


We are pleased to present you with the Operating Summary for the water pollution control facilities operated for you during 1968.

Both the financial and technical information presented should be of assistance to your present and future planning in this important phase of municipal activity.

A new format has been devised to allow greater readability with equally detailed content. We trust that this will meet with your approval.

Our staff wish to express their appreciation for your co-operation throughout the year.



D. S. Caverly,
General Manager.


D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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PORT ARTHUR
water pollution control plant

operated for

THE CITY OF PORT ARTHUR

by the

ONTARIO WATER RESOURCES COMMISSION

1968 ANNUAL OPERATING SUMMARY

FOREWORD

● This operating summary outlines the project's technical capabilities and financial status in 1968. Such information mirrors past and present performance, but a major intention is to anticipate the future -- to solve problems before they occur.

The new format in which this year's data are presented is designed to offer a higher level of readability than in the past, without a corresponding decrease in compactness, accuracy and detail.

Although your Regional Operations Engineer carries the major responsibility for the contents of the report, those involved in its preparation are attached to several Commission sections and divisions. The statistics section of the Division of Plant Operations compiled the information for the graphs and charts. The draughting section of the Division of Sanitary Engineering drew the graphs. The Division of Finance provided all cost data.

Only the close co-operation of these departments allowed the publication of this summary.

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'68 REVIEW

During the year, 1953. 80 million gallons were treated at a total expenditure of \$63,745.04. The cost of \$3.60 per million gallons is an increase of five percent compared with 1967.

The increased costs reflect a general increase in the cost of operating the plant. Average removal efficiencies of 42 percent for BOD and 57 percent for suspended solids were achieved for the year.

The plant was under 16-hour daily supervision, seven days a week, by a staff consisting of a chief operator and three plant operators. Use is also made of casual labour. Regular inspections were made by the operations engineer and the technical services section of the Division of Plant Operations.

PROJECT COSTS

NET CAPITAL COST:	2-0013-58 (Final)	\$2, 157, 635. 72
	2-0101-62 (Final)	699, 693. 96
	2-0156-63 (Estimated)	610, 181. 87

\$3, 467, 511. 55

DEDUCT: Portion Financed by CMHC-

	2-0101-62	\$457, 785. 36
	2-0156-63	393, 042. 83

Payments from Municipalities-

	2-0013-58	1, 212. 58	852, 040. 77
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Long Term Debt to OWRC \$2, 615, 470. 78

Debt Retirement Balance at Credit (Sinking Fund) December 31, 1968:

	2-0013-58	\$504, 685. 49
	2-0101-62	29, 522. 14
	2-0156-63	19, 381. 19
		\$ <u>553, 598. 82</u>

	<u>2-0013-58</u>	<u>2-0101-62</u>	<u>2-0156-63</u>	<u>Total</u>
Net Operating	\$ 63, 745. 04	\$ -	\$ -	\$ 63, 745. 04
Debt Retirement	43, 522. 00	4, 882. 00	4, 382. 00	52, 786. 00
Reserve	8, 372. 11	3, 915. 05	2, 404. 76	14, 691. 92
Interest Charged	<u>121, 073. 11</u>	<u>13, 581. 59</u>	<u>12, 190. 91</u>	<u>146, 845. 61</u>
TOTAL	<u>\$236, 712. 26</u>	<u>\$22, 378. 64</u>	<u>\$18, 977. 67</u>	<u>\$278, 068. 57</u>

RESERVE ACCOUNT

	<u>2-0013-58</u>	<u>2-0101-62</u>	<u>2-0156-63</u>	<u>Total</u>
Balance @ January 1, 1968	\$124,936.39	\$22,735.95	\$ 8,759.24	\$156,431.58
Deposited by Municipality	8,372.11	3,915.05	2,404.76	14,691.92
Interest Earned	7,535.16	1,433.54	573.21	9,541.91
	<u>140,843.66</u>	<u>28,084.54</u>	<u>11,737.21</u>	<u>180,665.41</u>
Less Expenditures	<u>1,025.00</u>	<u>-</u>	<u>-</u>	<u>1,025.00</u>
Balance @ December 31, 1968	<u>\$139,818.66</u>	<u>\$28,084.54</u>	<u>\$11,737.21</u>	<u>\$179,640.41</u>

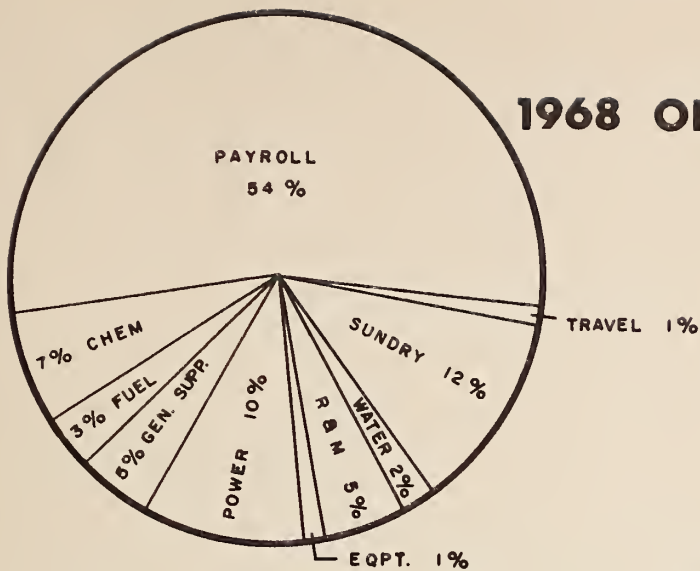
Monthly Operating Costs

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDRY	WATER	TRAVEL
JAN	3202.05	1838.44	410.13	189.34	530.51	-	102.43	-	55.29	15.31	-	60.61
FEB	4622.79	1850.59	377.55	210.63	533.18	-	244.72	45.17	166.68	1178.10	-	16.17
MAR	5514.99	2978.29	492.87	182.73	506.00	-	295.28	-	665.68	379.62	-	14.52
APRIL	5078.58	1858.84	352.54	215.42	743.44	-	172.93	214.29	169.32	913.50	409.87	28.43
MAY	5942.13	1858.84	785.98	165.18	535.61	1550.85	191.55	262.85	287.03	287.35	-	16.89
JUNE	5310.03	1858.84	826.86	318.30	-	-	415.83	-	135.51	1659.79	-	94.90
JULY	5009.53	1841.08	810.69	-	1008.74	-	306.93	-	316.80	131.08	509.27	84.94
AUG	6734.93	2805.68	1204.50	261.30	-	1639.05	148.54	465.15	166.07	29.16	-	15.48
SEPT	3686.52	2045.58	681.93	36.00	908.37	-	217.69	-	102.20	(240.07)	(96.83)	31.65
OCT	5853.50	1899.68	403.24	230.49	517.45	1281.00	198.25	-	304.87	422.74	595.78	-
NOV	4938.40	1858.84	296.27	134.33	655.95	-	161.60	-	191.15	1520.19	-	120.07
DEC	7851.59	4437.24	347.48	160.50	517.97	30.87	462.78	-	356.52	1309.07	-	229.16
TOTAL	63745.04	27131.94	6990.04	2104.22	6457.22	4501.77	2918.53	987.46	2917.12	7605.83	1418.09	712.81

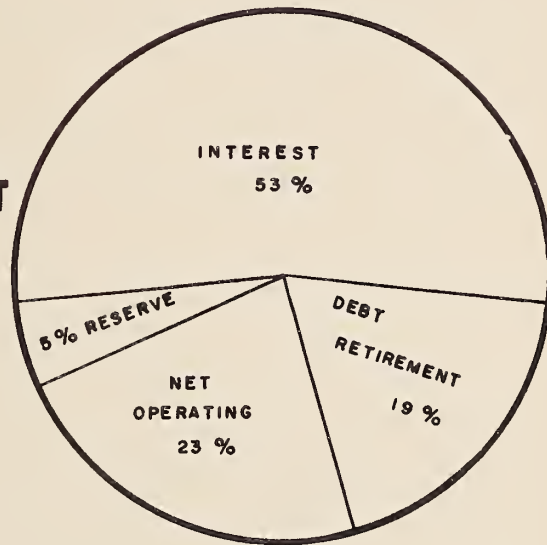
* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE \$6,422.65

BRACKETS INDICATE CREDIT

1968 OPERATING COSTS



TOTAL ANNUAL COST



Yearly Operating Costs

YEAR	M.G.TREATED	TOTAL COST	COST PER MILLION GALLONS	COST PER LB OF BOD REMOVED
1964	1648.94	\$45,374.87	\$27.52	4 cents
1965	1883.74	44,533.19	23.64	3 cents
1966	1825.52	49,656.84	27.20	3 cents
1967	1813.46	56,202.44	30.99	5 cents
1968	1953.8	63,745.04	32.63	5 cents

Process Data

The average daily flow in 1968 was 5.34 mgd and it ranged between 3.55 mgd and 8.01 mgd. The design capacity is 4.0 mgd, and the plant operated at flows higher than capacity for nearly 100% of the time.

The Port Arthur plant is a primary sewage treatment plant. Since it is overloaded, the effluent is of poor quality.

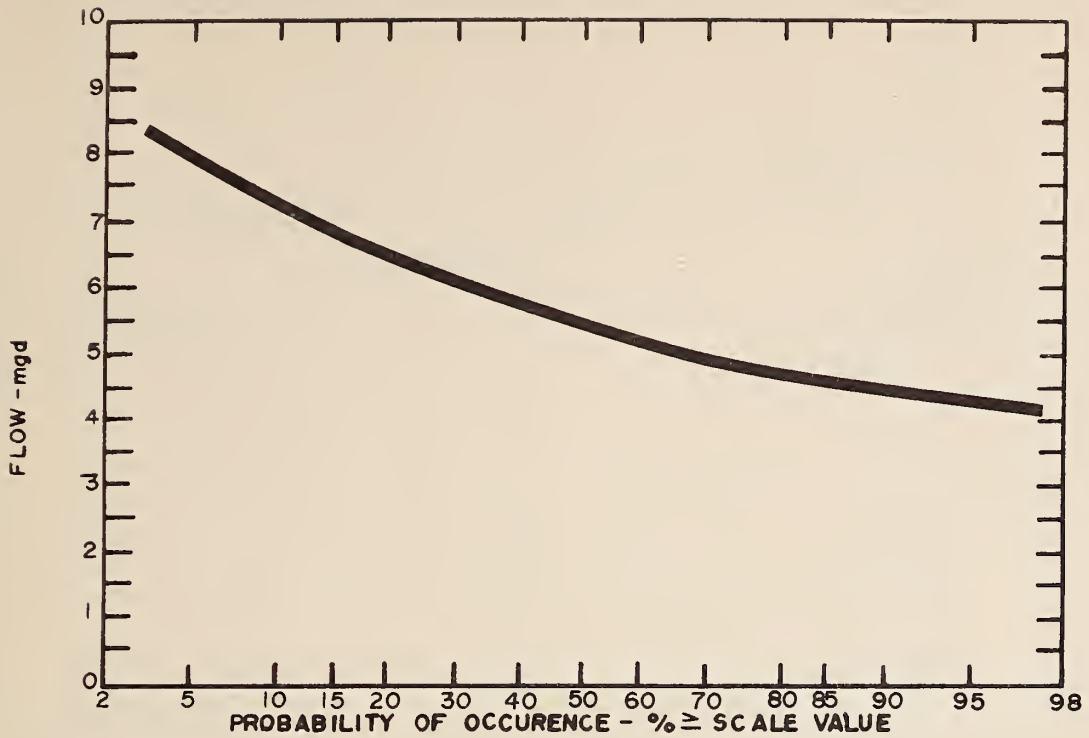
Chlorination was practiced from May to October 1968.

PLANT FLOWS and CHLORINATION

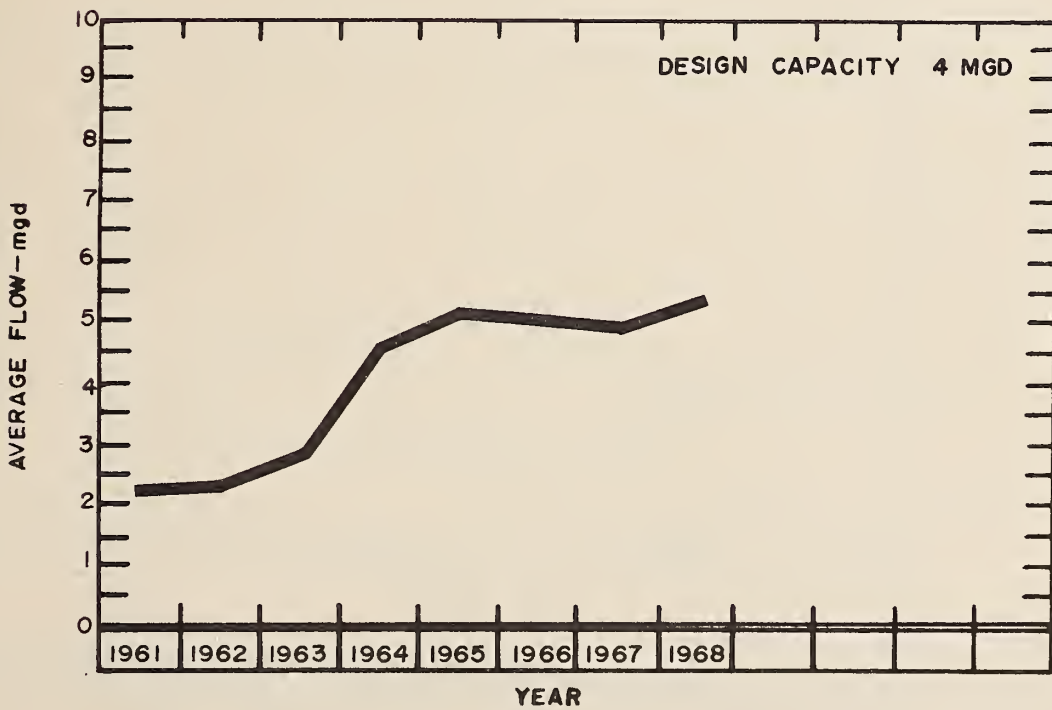
MONTH	TOTAL FLOW mg	AVERAGE DAILY FLOW mg	MAXIMUM DAILY FLOW mg	MINIMUM DAILY FLOW mg	CHLORINE USED 10 ³ lbs.	DOSAGE mg/l
JAN	132.8	4.29	5.28	3.97	0	-
FEB	109.5	3.78	4.35	3.76	0	-
MAR	161.1	5.20	7.35	3.98	0	-
APR	178.4	5.95	7.78	4.64	0	-
MAY	195.7	6.31	7.79	5.07	3.55	3.5
JUN	198.7	6.62	8.00	4.89	7.42	3.7
JUL	180.3	5.82	8.01	4.19	6.20	3.4
AUG	153.2	4.94	5.54	3.55	6.20	4.0
SEPT	170.3	5.68	7.58	4.59	6.20	3.6
OCT	191.5	6.18	7.91	4.83	6.40	3.3
NOV	149.2	4.97	5.94	4.47	0	-
DEC	133.1	4.29	4.85	3.80	0	-
TOTAL	1953.8	-	-	-	35.97	-
AVERAGE	-	5.34	-	-	6.00	3.3

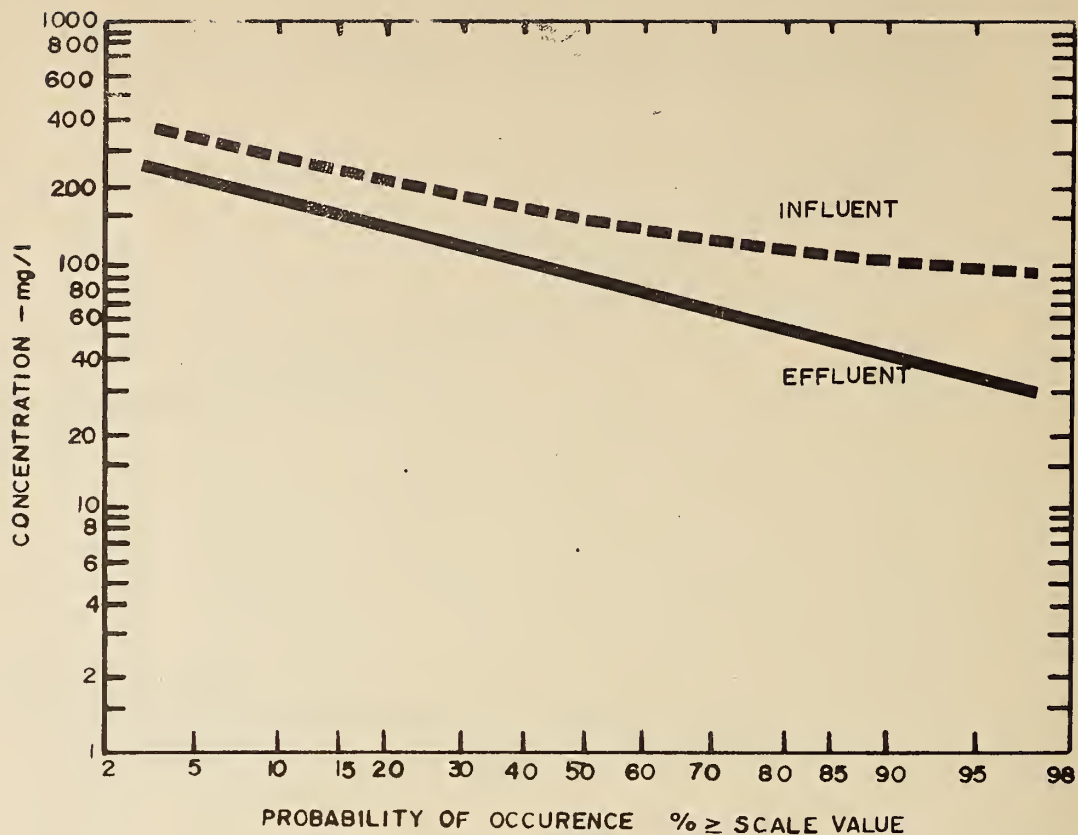
COMMENTS

A total of 1953.8 million gallons were treated during the year for an average daily flow of 5.34 million gallons. This is an increase of 7.7% over the 1967 values. Note: The maximum daily flows frequently approach double plant capacity, causing poor effluent.

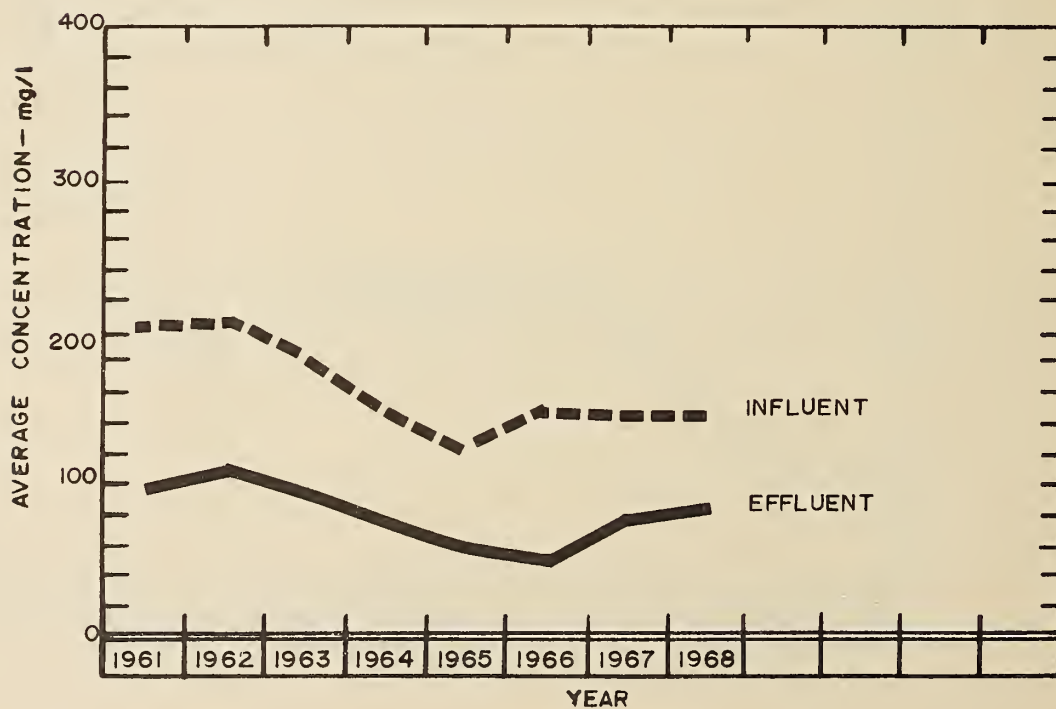


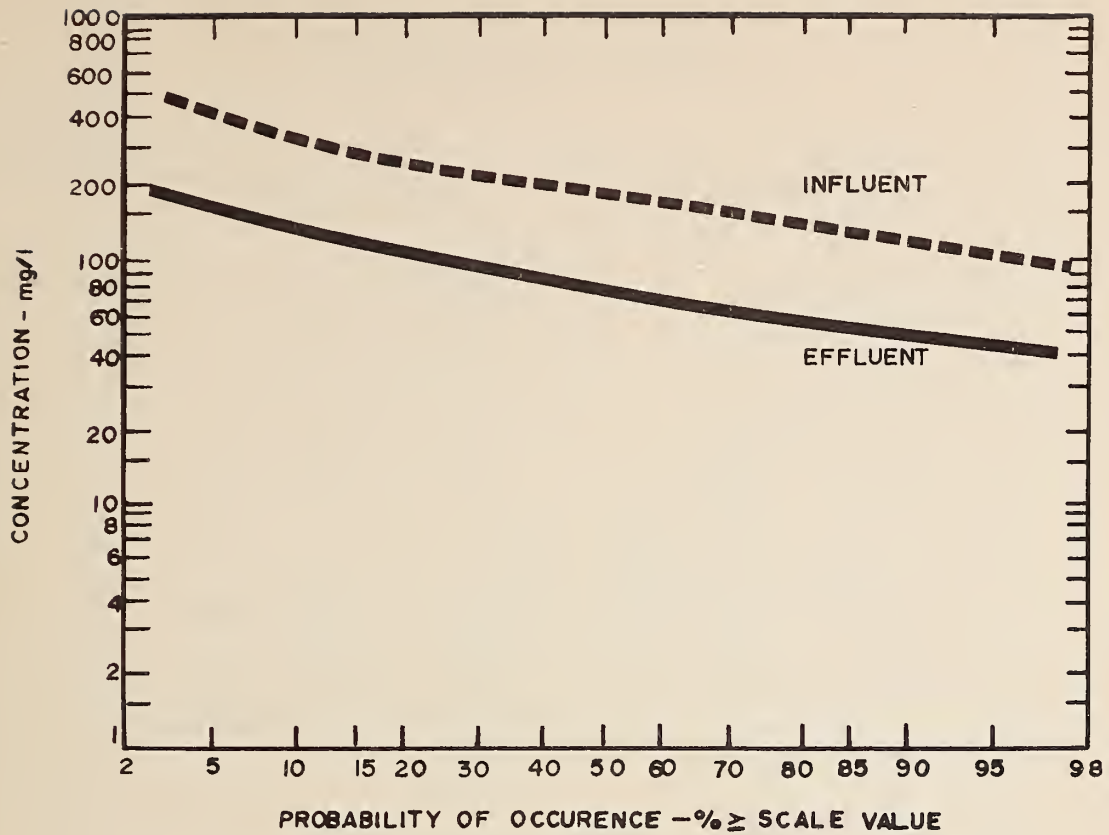
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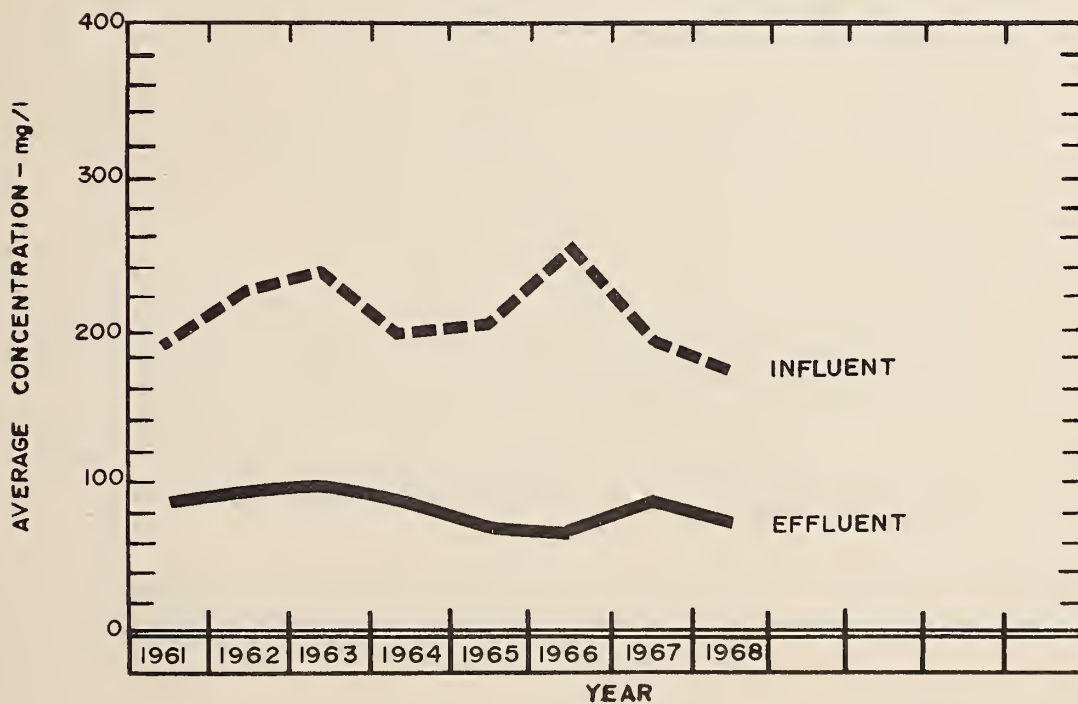


BIOCHEMICAL OXYGEN DEMAND





SUSPENDED SOLIDS



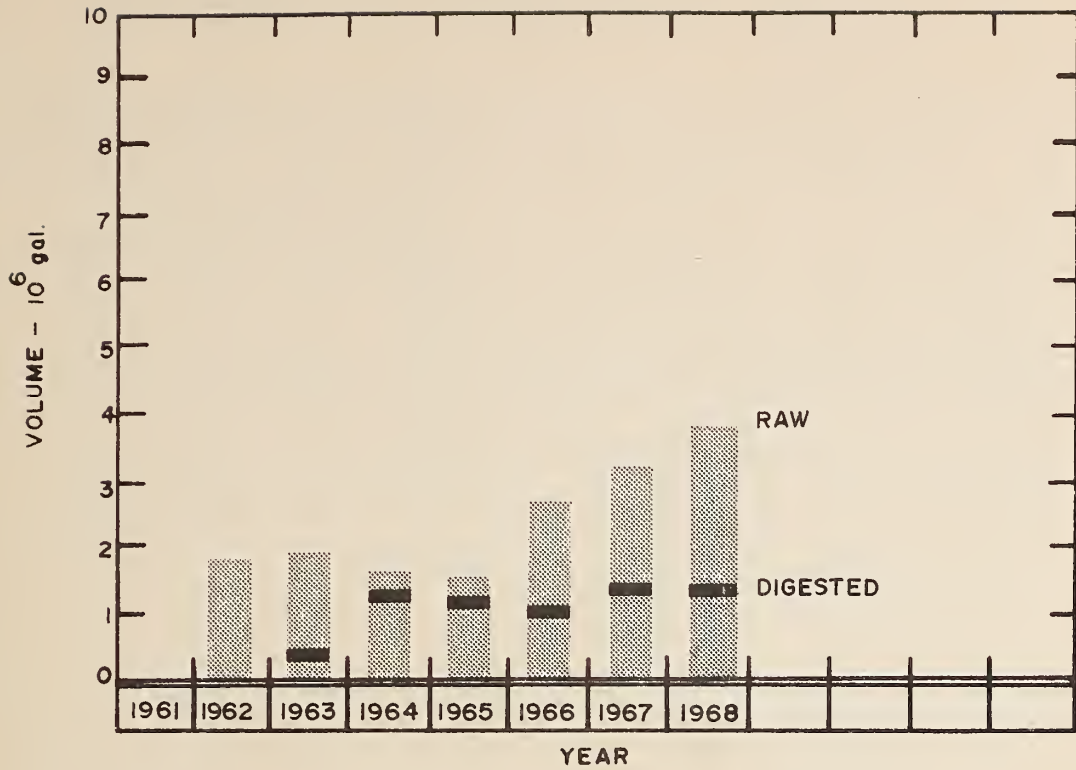
PLANT EFFICIENCY

MONTH	BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				GRIT
	INF CONC ^N mg/l	EFF CONC ^N mg/l	RED ^N %	REMOVAL 10 ⁵ lb	INF CONC ^N mg/l	EFF CONC ^N mg/l	RED ^N %	REMOVAL 10 ⁵ lb	REMOVAL ft ³
JAN	195	95	51	1.30	281	91	68	2.52	201
FEB	102	46	55	.61	140	58	59	.90	180
MAR	201	117	42	1.35	142	80	44	1.00	250
APR	91	57	37	.61	172	106	38	1.78	179
MAY	100	82	18	.35	154	58	62	1.88	231
JUN	120	46	62	1.47	120	58	52	1.23	477
JULY	81	39	52	.75	130	54	58	1.37	397
AUG	151	88	42	.96	190	77	59	1.73	189
SEPT	184	87	53	1.65	190	99	48	1.55	97
OCT	155	99	36	1.07	175	60	66	2.20	71
NOV	203	136	33	1.00	233	77	67	2.33	47
DEC	201	145	28	.74	186	76	59	1.46	35
TOTAL	-	-	-	11.86	-	-	-	19.95	2354
AVERAGE	149	87	42	.99	176	75	57	1.66	196

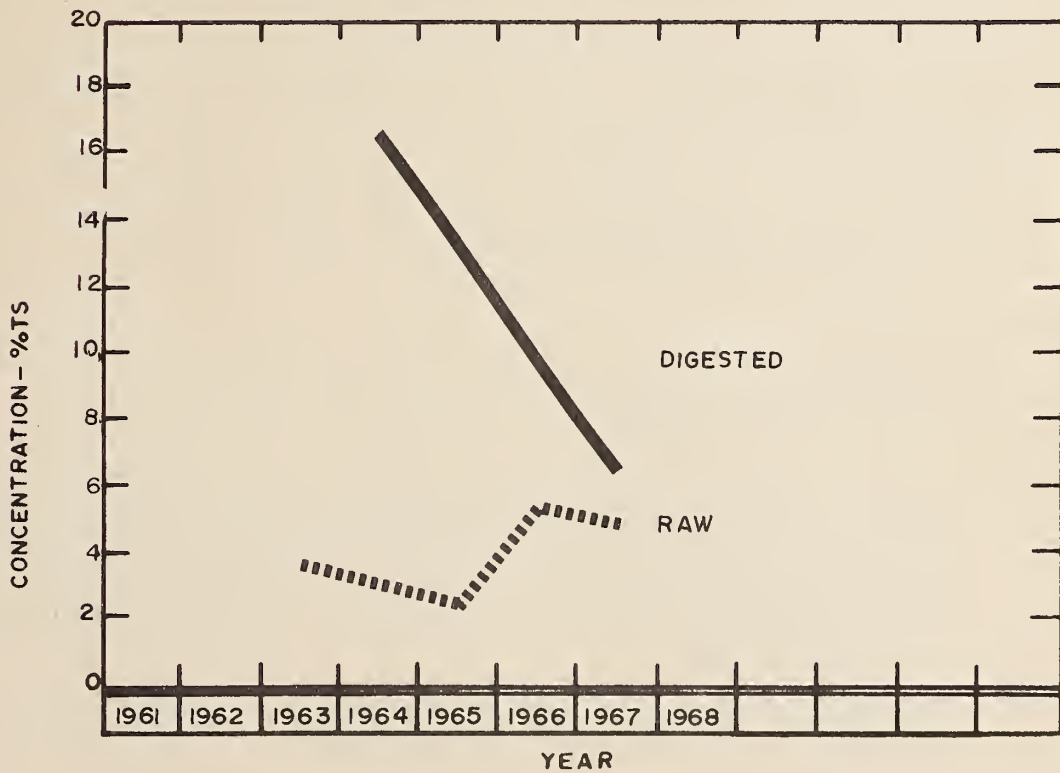
COMMENTS

The average BOD and suspended solids in the raw sewage was 149 mg/l and 176 mg/l respectively. The effluent BOD and suspended solids was 87 mg/l and 75 mg/l respectively. These results gave reductions of 42 and 57%. This range is normal for a primary plant.

A total of 2354 cu. ft. of grit was removed. That is an average of 0.83 cubic feet of grit removed per million gallons treated.



DIGESTION



SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
	VOLUME 10 ⁵ gal	T. S. %	V. S. %	VOLUME 10 ⁵ gal	T. S. %	V. S. %	VOLUME 10 ⁵ gal	T. S. %	LIQUID yd ³	DEWATERED yd ³
JAN	2.98	2.9	65	2.20	4.7	77	-	-	1309	0
FEB	2.78	3.2	72	0	7.1	74	-	-	0	0
MAR	2.98	2.7	66	1.65	7.6	67	-	-	979	0
APR	2.88	-	-	.50	-	-	-	-	297	0
MAY	2.98	-	-	3.54*	-	-	-	-	2101	0
JUN	3.00	-	-	0	-	-	-	-	0	0
JUL	2.74	16.4	27	0	-	-	2.06	-	0	0
AUG	3.18	2.7	78	.86	8.4	66	2.40	-	514	0
SEPT	3.72	-	-	1.61	-	-	2.08	-	956	0
OCT	4.03	-	-	0	-	-	4.02	-	0	0
NOV	3.51	-	-	2.20	4.4	72	1.27	-	1328	0
DEC	3.79	2.3	84	.48	7.2	66	3.27	-	286	0
TOTAL	38.57	-	-	13.04	-	-	-	-	7770	0
AVERAGE	3.21	5.0	65	1.09	6.6	70	2.51	-	648	0

* Digester cleaning completed May 25.

COMMENTS

Flow records for the first six months were incomplete due to the cleaning of the digester.

Average flow of raw sludge into the digester was 321,000 gallons per month. The flow out of the digester was recorded as 163,000 gallons per month of digested sludge, and 251,000 gallons of supernatant, i.e., the outflow is too great. The error is attributed to the coarse metering of supernatant flows which should average $(321-163) \times 1000 = 158,000$ gallons.

The average digested sludge concentration was very low at 6.6% total solids.

CONCLUSIONS

High flows continue to tax the present facilities and reduce the operational efficiency of the digester. It is noted also that the BOD removal has dropped by some two percent in 1968 compared to 1967.

Enlargement of the present treatment facilities was previously recommended and this recommendation still stands.

A consultant was engaged to prepare a report on expansion.





Water management in Ontario